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CASLER, D — EXAMINER

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ART UNIT	PAPER NUMBER
3305	10

DATE MAILED: 07/11/94

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☒ Responsive to communication filed on 5-11-94 ☐ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), — days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☒ Notice of References Cited by Examiner, PTO-892.
2. ☒ Notice of Draftsman's Patent Drawing Review, PTO-948.
3. ☒ Notice of Art Cited by Applicant, PTO-1449.
4. ☐ Notice of Informal Patent Application, PTO-152.
5. ☐ Information on How to Effect Drawing Changes, PTO-1474.
6. ☐ _____.

Part II SUMMARY OF ACTION

1. ☒ Claims 89-161 are pending in the application.

   Of the above, claims _____ are withdrawn from consideration.

2. ☐ Claims _____ have been cancelled.
3. ☐ Claims _____ are allowed.
4. ☒ Claims 89-161 are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ Claims _____ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawings are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____, has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
11. ☒ The proposed drawing correction, filed 3-17-94, has been ☒ approved; ☐ disapproved (see explanation).
12. ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. _____; filed on _____.
13. ☐ Since this application apppears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
14. ☐ Other

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Part III DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 89-161 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 89,120, and 135, are incomplete in that there is no step of detecting a resonant response from which an output may be generated and in part c of each claim, "the region's resonant response" lacks positive antecedent basis. In claim 93, line 2, "the registration" lacks positive antecedent basis. In claim 95, line 2, "the in vivo region is exposed" is not set forth as a positive method step. In claim 111, line 1, "wherein said steps... are repeated" is not a positive method step. In claims 139, 150, and 158, there is no structural association between the elements and the functional recitations lack proper means phraseologyand there is no structure set forth to effect the detection of the resonant response from which an output may be generated. Claims 151-157 and 159-161 do not set forth any structure to further limit the apparatus and recite only functional language.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 89-91,96-106,108,120,121,123-126,128,135-138 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Hajnal et al.

Hajnal et al. teaches everything including MR imaging of structure within the nervous system that exhibits diffusion anisotropy in order to highlight desired structures and suppress other structures within the displayed image. Hajnal et al. accomplishes this by subjecting the subject to polarizing and excitation fields,detects a response and generates a corresponding output. The excitation fields include diffusion weighted gradients and the analysis includes outputing information representative of fascicles found in peripheral nerves.

Claims 139,144-161 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Suzuki et al.

Suzuki et al. teaches everything including an apparatus and method for obtaining brain surface images which includes a polarizing field source, am excitation and output arrangement, a sequence controller, and a processor.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 107,109,110-114,116-119,130,131,133, and 134 are rejected under 35 U.S.C. § 103 as being unpatentable over Hajnal et al. in view of Suzuki et al. and further in view of Bydder et al.

Hajnal et al. teaches everything as stated supra and further teaches that it is essential to properly position and immobilize the patient. Hajnal et al. does not specifically teach suppressing the fat around the nerves or using a splint to immobilize the patient.

Suzuki et al teaches everything as stated supra and further teaches inhibiting the signals obtained from fat on the brain surface.

Bydder et al. teaches patient immobilization to reduce artifacts due to patient motion.

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It is the opinion of the examiner that motion artifacts and the various means to reduce the occurrence of patient movement during imaging are well known in the art and it is further well known to suppress or enhance various structures within an image to better localize and diagnose the tissue.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include in the device of Hajnal et al. a means for suppressing the fat surrounding the nerves being imaged as taught by Suzuki et al and to use any known means to reduce patient motion as is well known in the art and taught by Bydder et al.

Claims 92,95 and 122 are rejected under 35 U.S.C. § 103 as being unpatentable over Hajnal et al. in view of Inoue and further in view of Dixon.

Hajnal et al. teaches everything as stated supra. Hajnal et al. does not teach subtracting image signals or adjusting for proper registration of the image.

Inoue teaches a method of separating water and fat in an image which includes calculating the difference between the two different signals.

Dixon teaches a method for imaging in which water and fat may be separated and the difference between water and fat intensity may be shown.

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It would have been obvious at the time the invention was made to one of ordinary skill in the art to include in the device of Hajnal et al. a means for calculating the difference between the fat and water signals to better localize the structures of interest as taught by Inoue and Dixon.

Claim 115 is rejected under 35 U.S.C. § 103 as being unpatentable over Hajnal et al. in view of Suzuki et al and further in view of Gordon.

Hajnal et al. teaches everything as stated supra. Hajnal et al. does not teach using a contrast agent to enhance imaging.

Gordon teaches the use of a contrast agent and fat suppression techniques to enhance imaging.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use a contrast agent in Hajnal et al. to enhance imaging as taught by Gordon.

Claim 140 is rejected under 35 U.S.C. § 103 as being unpatentable over Suzuki et al and further in view of Gordon.

Suzuki et al. teaches everything as stated supra. Suzuki et al does not teach the use of a phased array coil system.

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Gordon teaches the use of a phased array coil system to obtain a larger field of view and to increase the SNR.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use a phased array coil system in Hajnal et al. to obtain a larger field of view and to increase the SNR as taught by Gordon.

Claims 141,142, and 143 are rejected under 35 U.S.C. § 103 as being unpatentable over Suzuki et al in view of Hajnal et al. and further in view of Sepponen.

Suzuki et al. teaches everything as stated supra. Suzuki et al. does not teach the use of a splint to immobilize the patient and markers to relate the position of the splint.

Sepponen teaches the use of markers on a frame to detect the frame position and reduce problems associated with patient movement.

As stated above, it is the opinion of the examiner that various means to immobilize a patient are well known in the art. It would have been obvious at the time the invention was made to one of ordinary skill in the art to use a marked splint in Suzuki et al. to immobilize the patient to reduce motion artifacts and provide means for determining the position of the splint as taught by Sepponen.

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94 122 *Allowable Subject Matter*

Claims 93, 127, 129, and 132 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112 and to include all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1.) Keren teaches a device for separating spectral components in imaging.

2.) Harms et al. teaches MR imaging using a back to back pulse sequence.

3.) Fossel teaches a method for detecting cancer.

4.) Listerud et al. teaches a method for fat suppression.

5.) Deimling et al. teaches a method for calculating fat and water separation.

6.) Wright teaches a device for MR projection angiography.

7.) Harker teaches a method of measuring fat content.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Casler whose telephone number is (703) 308-3552.

LEE S. COHEN
PRIMARY EXAMINER
ART UNIT 335

BLC/blc
June 17, 1994